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REMARKS

Claims 1 through 11 are pending in the application.

Claim 1 has been amended to clarify that the feedstuffs of the invention are intended for agricultural livestock. Support for this amendment can be found in the Application-as-filed, for example on Page 6, lines 24 through 28.

Claims 1, 8 and 10 have been amended to reflect that the enzymes are active. Support for this amendment can be found in the Application-as-filed, for example on Page 6, lines 12 through 15.

Claims 1, 8 and 10 have also been amended to recite that the feedstuffs of the invention may advantageously include sorbic acid in amounts ranging from 0.2 to 5.0 % by weight. Support for this amendment can be found in the Application-as-filed, for example on Page 4, lines 14 through 16, and original Claim 2.

Claims 1 and 10 have also been amended to remove the term "and/or enzyme product".

Claim 2 has also been amended to recite that the feedstuffs of the invention may advantageously include sorbic acid in amounts ranging from 0.5 to 2.0 % by weight. Support for this amendment can be found in the Application as filed, for example on Page 4, lines 14 through 16.

Claim 9 has been canceled.

Reexamination and reconsideration of this application, withdrawal of all rejections, and formal notification of the allowability of the pending claims are earnestly solicited in light of the remarks which follow.

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Claim Rejections - 35 USC § 112, Second Paragraph

Claims 1 through 11 stand rejected over the phrase "enzyme product." Without addressing the merits of this rejection, the phrase "enzyme product" has been deleted from Claims 1 and 10. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claim 9 stands further rejected over the phrase "producing feedstuffs with a performance improving effect." Without addressing the merits of this rejection, Claim 9 has been canceled, thereby obviating this rejection.

***The Claimed Invention is Patentable
In Light of the Art of Record***

Claims 1, 3 and 8 through 10 stand rejected as anticipated by United States Patent No. 6,190,898 to Becker et al. ("US 898"). Claims 1, 2 and 8 through 11 stand rejected as anticipated by JP 73-007,060. ("JP 060"). Claims 1, 3, 5 and 8 through 11 stand rejected as anticipated by United States Patent No. 3,988,483 to Deyoe. ("US 483"). Claim 2 stands rejected as being obvious in light of US 483. Claims 1, 2 and 8 through 10 stand rejected as anticipated by United States Patent No. 6,350,485 to Brunner. ("US 485"). Claims 1 through 3 and 8 through 10 stand rejected as anticipated by United States Patent No. 5,066,498 to McCauley III. ("US 498"). Claims 1, 3 and 8 through 10 stand rejected as being anticipated by United States Patent No. 6,221,406 to Meschonat et al. ("US 406"). Claims 1 through 3, 5 and 8 through 10 stand rejected as being anticipated by Leahy et al. ("Leahy"). Claims 4 through 7 stand rejected over any of US 898, US 483, US 485, or US 406, each in view of United States Patent No. 4,482,550 to Pais et al. ("US 550").

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It may be useful to consider the invention before addressing the merits of the rejection. Enzymes can be used to degrade anti-nutritional constituents of feed to such an extent that an increased availability of other nutrients is achieved. Enzymes are further known to loosen cellular wall structures, thereby increasing the digestibility of cellular wall constituents. Externally provided enzymes may also promote the formation of endogenous enzymes, as well, thus improving digestion. (The Examiner's attention is kindly directed to the Application-as-filed on Page 3, first full paragraph in its entirety).

Unfortunately, although benefiting animal digestion, the breakdown of high molecular weight feedstuff constituents also improves the opportunities for spoilage microorganisms to grow. Preservatives, such as bacteriacides and fungicides, are known. Preservatives derived from acids and/or salts thereof are well known, in fact. In addition to preservative effects, acids within feedstuffs may provide additional benefits. Comparatively high amounts of acids, particularly sorbic acid, have been found to provide nutritional activity in piglet rearing, for example. (The Examiner's attention is kindly directed to the Application-as-filed on Page 2, lines 10 - 12) However, conventional wisdom to date has indicated that acids are detrimental to enzyme function, as evidenced by several of the cited references, i.e. US 483 (at Col. 7, lines 47 - 52) and US 485 (at Col. 5, lines 36 - 38).

Surprisingly, Applicant has found relatively elevated, yet nevertheless beneficial, amounts of sorbic acid that do not significantly harm active enzymes. More particularly, Applicant has discovered advantageous compositions that include moderate amounts of sorbic acid and active enzymes. The enzymes within the claimed compositions retain their activity upon subsequent application to feedstuffs. The resulting feedstuffs provide a highly advantageous balance of improved digestible constituent content and longer shelf life. In addition, the feedstuffs of the invention unexpectedly provide a distinct improvement in growth rate and feed conversion, especially in piglet rearing. (The Examiner's attention is kindly directed to the Application-as-filed on Page 8, lines 4 through 10 and Page 3, line 25 - Page 4, line 2).

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Accordingly, the claims are directed to agricultural livestock feedstuffs that include sorbic acid in the range from 0.2 to 5.0% by weight, along with at least one active enzyme. In particularly advantageous embodiments, the concentration of sorbic acid is in the range from 0.5 to 2.0 % by weight, as recited in Claim 2. The claimed feedstuffs may beneficially include one or more of a wide variety of active enzymes, including phytase, cellulase, glucanase, hemicellulase (xylanase), amylase, galactosidase, pentosanase, glucosidase, various lipases, mannase (endo-1,4- β), polygalacturonase and transglutaminase, as recited in Claim 3.

The cited references do not teach or suggest the claimed compositions.

US 898 is primarily directed to methods of preparing highly purified, crystalline cellulase enzymes on a large scale basis, for use in applications such as detergents, stonewashing compositions and the like. (Col. 1, lines 3 – 7; Col. 3, lines 11 – 22; and Col. 7, lines 18 – 30). US 898 is more particularly directed to methods of crystallizing a specific enzyme subgroup, i.e. cellulases lacking a distinct binding domain, using a specific group of salts and a specific temperature range. (Col. 2, lines 18 – 23). In contrast to the opinion urged within the outstanding Office Action, US 898 is directed to the use of salts, not acids. In fact, US 898 provides a laundry list of suitable salt anions and cations. (Col. 2, lines 41 – 47). The anion is preferably a sulfate, acetate or chloride, while the cation is preferably sodium, ammonium or magnesium. (Col. 2, lines 48 – 52). The salt may be included within the crystallization bath in volume concentrations of up to 10.0 % w/v. (Col. 6, lines 38 - 40). Following the salt addition, the resulting crystallization bath may exhibit a significantly alkaline pH, such as a pH of up to 10. (Col. 6, lines 45 – 48).

US 898 thus does not teach or suggest the recited agricultural livestock feedstuffs that include sorbic acid, and most certainly not feedstuffs including sorbic acid in the range from 0.2 to 5.0% by weight along with at least one active enzyme. And US 898, directed to a particular cellulase subclass, further does not teach or suggest the wide variety of enzymes recited in Claim 3.

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Accordingly, Applicant respectfully submits that Claims 1, 3 and 8 through 10 are patentable in light of US 898, considered either alone or in combination with the art of record.

JP 060 is directed to liquid feedstuffs for application to silkworms. JP 060 indicates that a solid porous feedstuff pellet is initially formed, and then dipped into an aqueous solution containing a mixture of acids. The working example provided in JP 060 does not note the presence of enzymes. The working example of JP 060 does note the presence of sorbic acid within the aqueous solution used to dissolve the porous pellet. JP 060 also recommends a particular volume concentration for the sorbic acid within the aqueous solution. In contrast to the opinion urged within the outstanding Office Action, however, JP 060 discloses sorbic acid within the resulting dissolved silkworm feedstuff in an amount of 0.163 weight percent.

JP 060 thus does not teach or suggest the recited agricultural livestock feedstuffs that include from 0.2 to 5.0% by weight sorbic acid and at least one active enzyme. And JP 060 most certainly does not teach or suggest such agricultural feedstuffs incorporating from 0.5 to 2.0 % by weight sorbic acid, as recited in Claim 2.

Accordingly, Applicant respectfully submits that Claims 1, 2 and 8 through 11 are patentable in light of JP 060, considered either alone or in combination with the art of record.

US 483 is directed to methods of making starch-NPN ("non-protein nitrogenous") liquid feed supplements using a hydrothermal type cooker which cooks the food under turbulence. (Col. 2, lines 26 – 38). The resultant products are believed to differ from conventional extrusion-processed chunk starch-NPN products. (Col. 4, lines 2 – 6). US 483 notes the use of any of a number of acids as mold inhibitors. (Col. 7, lines 2 – 8). US 483 further notes the use of amylase to lower the viscosity of feed which has been enriched with molasses. (Col. 7, lines 42 – 47). Upon sufficiently lowering the viscosity, acid is added to "to stop" the action of the amylase. (Col. 7, lines 47 – 52). US 483 is silent as to a recommended concentration range for the acid inhibitor, other than generically referencing "a small amount." (Col. 7, line 49). As

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noted by the Examiner, US 483 does, however, indicate the presence of phosphoric acid in specific amounts within the molasses enriched working examples, such as 1.0 and 3.6 wt %, presumably to inactivate the amylase therein.

US 483 thus does not teach or suggest the recited agricultural livestock feedstuffs that include from 0.2 to 5.0% by weight sorbic acid and at least one active enzyme. US 483 likewise does not teach or suggest such feedstuffs incorporating from 0.5 to 2.0 % by weight sorbic acid, as recited in Claim 2. And US 483, briefly noting the use of amylase, further does not teach or suggest the wide variety of enzymes recited in Claim 3.

Accordingly, Applicant respectfully submits that Claims 1, 2, 3, 5 and 8 through 11 are patentable in light of US 483, considered either alone or in combination with the art of record.

US 485 is directed to tetrasodium pyrophosphate palatability enhancers that are applied to dry pet foods, particularly dry cat food. (Col. 2, lines 18 – 21; 29 – 35 and 48 – 50). The palatability enhancer is applied to the cat food in an amount ranging from 0.5 to 3.0 % by weight. (Col. 5, lines 2 – 4). US 485 then goes on to note that preservatives may be added to the enhancer composition. (Col. 5, lines 36 – 39). The preservatives may be included *within the resulting treated pet food* in amounts ranging from 0.005 to 0.03 wt%. (Please see Col. 4, line 2 – 3 (composition of liquid palatability enhancer) in conjunction with Col. 5, lines 2 – 4 (composition of resulting cat food)). Again evidencing the state of conventional wisdom regarding the inactivation of enzymes, US 485 notes that protease may be added to the enhancer composition and “later inactivated” with acid. (Col. 5, lines 36 – 38).

US 485 thus does not teach or suggest the recited agricultural livestock feedstuffs that include from 0.2 to 5.0% by weight sorbic acid and at least one active enzyme. US 485 likewise does not teach or suggest from 0.5 to 2.0 % by weight sorbic acid, as recited in Claim 2. In fact, US 485 teaches away from such amounts by noting the deactivation of enzymes by acids and incorporating minimal amounts of preservatives within the resulting pet food.

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Accordingly, Applicant respectfully submits that Claims 1, 2 and 8 through 10 are patentable in light of US 485, considered either alone or in combination with the art of record.

US 498 is directed to nutritional supplements that improve the skin, hoof and coat of domestic animals. (Col. 1, lines 12 – 16). The nutritional supplements include a number of components, including DL-methionine, biotin, and chelated zinc. (Col. 3, lines 36 – 42). The supplement may further include yeast culture, said to be an excellent source of amylase. (Col. 4, lines 45 – 46). In addition, the supplement may contain any of a generic list of preservatives. (Col. 4, lines 59 – 62). Although providing quite detailed weight ranges for the nutritional supplement compositions (as cited in the Office Action), US 498 is silent as to the amount of supplement to be incorporated into the feedstuff. Based upon the working examples, the preservative appears to be present within the resulting feedstuffs in amounts ranging from about 0.05 to 0.11 wt %. (Col. 6, line 1 – Col. 7, line 4).

US 498 thus does not teach or suggest the recited agricultural livestock feedstuffs that include from 0.2 to 5.0% by weight sorbic acid and at least one active enzyme. US 498 likewise does not teach or suggest such feedstuffs incorporating from 0.5 to 2.0 % by weight sorbic acid, as recited in Claim 2. And US 498, briefly noting the use of amylase, most certainly does not teach or suggest the wide variety of active enzymes recited in Claim 3.

Accordingly, Applicant respectfully submits that Claims 1 through 3 and 8 through 10 are patentable in light of US 498, considered either alone or in combination with the art of record.

US 406 is directed to methods of incorporating enzymes into feeds using purified pregranule compositions. (Col. 1, line 66 – Col. 2, line 4 and Col. 2, lines 13 – 32). US 406 notes both bacterial contamination and enzyme inactivity as feedstuff issues. (Col. 1, lines 46 – 51). To address these issues, US 406 forms pregranule compositions including enzyme and a particular flour that has been steam treated and ground to a specific particle size prior to incorporation. (Col. 2, lines 13 – 31 and Col. 2, line 60 – Col. 5, line 5). US 406 generically

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notes that that the pregranules may contain any of a number of stabilizers, adjusters and preservatives. US 406 then goes on to enumerate several alcohols, glycols and salts. (Col. 6, lines 53 – 61). US 406 is silent as to any recommended amount of stabilizers, adjusters or preservatives.

US 406 thus does not teach or suggest the recited agricultural livestock feedstuffs that include from 0.2 to 5.0% by weight sorbic acid along with at least one active enzyme.

Accordingly, Applicant respectfully submits that Claims 1, 3 and 8 through 10 are patentable in light of US 406, considered either alone or in combination with the art of record.

Leahy is directed to the effect on beef cattle of addition of sorbic acid and/or amylase to corn silage. As noted by the Examiner, Leahy investigated the incorporation of 0.10 % sorbic acid within silage as a yeast, mold and bacteria inhibitor (Pages 490 and 491).

Leahy thus does not teach or suggest the recited agricultural livestock feedstuffs that include from 0.2 to 5.0% by weight sorbic acid and at least one active enzyme. Leahy further does not teach or suggest such feedstuffs incorporating from 0.5 to 2.0 % by weight sorbic acid, as recited in Claim 2. Nor does Leahy teach or suggest the wide variety of enzymes recited in Claim 3.

Accordingly, Applicant respectfully submits that Claims 1 through 3, 5 and 8 through 10 are patentable in light of Leahy, considered either alone or in combination with the art of record.

Claims 4 through 7 are also patentable in light of the combination of any of US 898, US 483, US 485, or US 406 in view of US 550.

US 550 is directed to the use of titanium complexes to promote weight gain in domestic animals. (Col. 1, lines 40 – 45). US 550 notes that a preservative may be added to fodder stored

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in a wet environment. (Col. 1, lines 53 – 58). The titanium complex may be present in the fodder in amounts ranging from 0.001 to 6.0 percent by weight. (Col. 1, lines 59 – 67). The preservative may be present in the feedstuff in amounts of up to 0.12 weight percent. (Col. 1, line 66 – Col. 2, line 2 in conjunction with Col. 1, lines 59 – 67). US 550 notes that the titanium complex may have a beneficial effect upon a domestic animal's endogenous enzymes. (Col. 1, lines 45 – 49). US 550 is silent as to the external administration of enzymes, however.

US 550, considered either alone or in combination with the art of record, thus does not teach or suggest the recited agricultural livestock feedstuffs that include from 0.2 to 5.0% by weight sorbic acid and at least one active enzyme.

Applicant respectfully submits that there would have been no motivation to have combined these references. However, even if combined (which Applicant submits should not be done) the claimed invention would not result. As noted above, none of US 898, US 483, US 485, US 406 or US 550 teach or suggest feedstuffs incorporating from 0.2 to 5.0% by weight sorbic acid, much less feedstuffs incorporating such amounts of sorbic acid along with at least one active enzyme.

Accordingly, Applicant respectfully submits that Claims 4 through 7 are patentable in light of the combination of any of US 898, US 483, US 485, US 406 and US 550.

Statement in Conformance with 37 CFR 3.73(b)

As noted above, a Power of Attorney, appointing Cathy R. Moore as a Practitioner of Record for Nutrinova Nutrition Specialties & Food Ingredients GmbH, is attached. The above-referenced application has been assigned in its entirety to Nutrinova Nutrition Specialties & Food Ingredients GmbH at Reel/Frame 014935/0537. Copies of the assignment will be forwarded upon request. Accordingly, Cathy R. Moore is authorized to act on behalf of Mitsubishi Polyester Film, GmbH in the above-referenced application.

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CONCLUSION

It is respectfully submitted that Applicants have made a significant and important contribution to the art, which is neither disclosed nor suggested in the art. It is believed that all of pending Claims 1 through 8, 10 and 11 are now in condition for immediate allowance. It is requested that the Examiner telephone the undersigned if any questions remain to expedite examination of this application.

It is not believed that fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional fees are necessary to allow consideration of this paper, the fees are hereby authorized to be charged to Deposit Account No. 50-2193.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office at facsimile number (703) 872-9306 on September 15, 2004.

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